



BURLINGTON

(Drury Lane)

**water pollution
control plant**

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B874
1967
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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

**TD
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B874
1967**

Burlington Drury Lane : water
pollution control plant.

81575



ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET, TORONTO 5
OFFICE OF THE GENERAL MANAGER

Members of the Burlington Drury Lane Local Advisory Committee,
Town of Burlington.

Gentlemen:

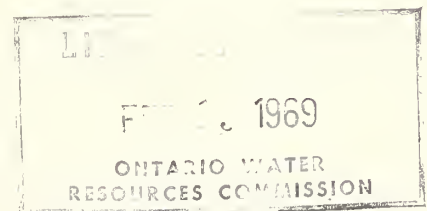
We are happy to present you with the 1967 Operating Summary for the
Burlington Drury Lane Water Pollution Control Plant, OWRC Project No.
2-0051-60.

Your co-operation with our staff throughout the year has been appreciated.
Only with such co-operation can the war against water pollution be waged
effectively.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly", is written over the typed name.

D. S. Caverly,
General Manager.





ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET
TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER
W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

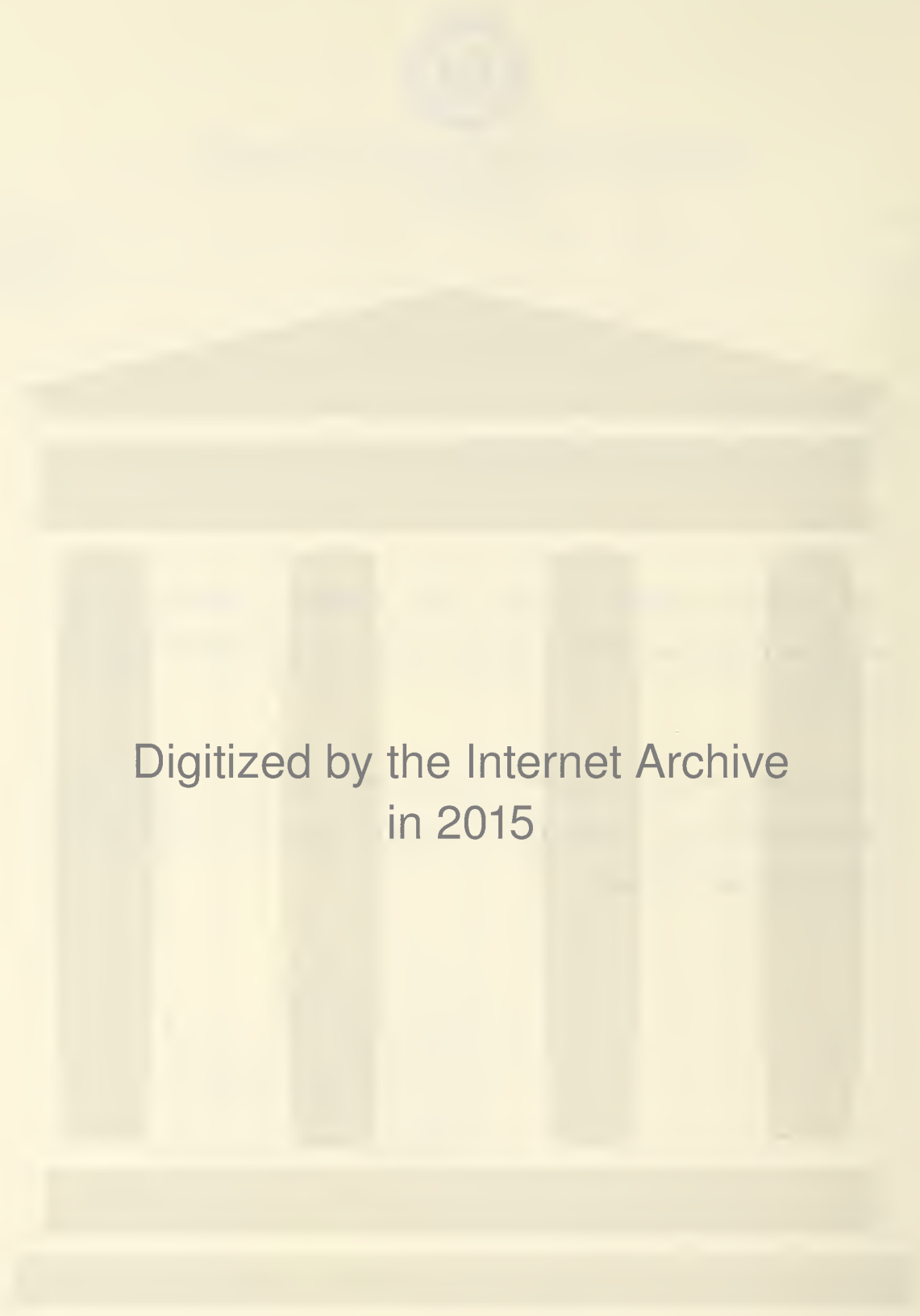
I am pleased to submit to you the 1967 Operating Summary for the Burlington Drury Lane Water Pollution Control Plant, OWRC Project No. 2-0051-60.

The summary reviews progress during the year, outlines operating problems encountered and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

A handwritten signature in dark ink, reading "D. A. McTavish". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.



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FOREWORD

● This operating summary has been prepared in order to acquaint readers with the management of the project during 1967. The efficiency of the plant's operation is reflected in a general review. Significant financial details are recorded, and technical performance is illustrated by graphs and charts.

The summary should answer two salient questions. Are the project's facilities adequate at this time? And can the project meet future requirements?

The Regional Operations Engineer is primarily responsible for the preparation of the report, and will be pleased to answer any questions regarding it.

Most of the material for the graphs and charts was compiled by the statistics section of the Division of Plant Operations, with the final versions of the graphs being drawn by the draughting section of the Division of Sanitary Engineering. Cost data were provided by the Division of Finance.

It will be evident from the report that all of these groups co-operated with substantial success.

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BURLINGTON
Drury Lane

water pollution control plant

operated for
THE TOWN OF BURLINGTON
by the
ONTARIO WATER RESOURCES COMMISSION

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Assistant Director: C. W. Perry
Regional Supervisor: A. C. Beattie
Operations Engineer: R. S. McKittrick

801 Bay Street Toronto 5

'67 REVIEW

The Burlington Drury Lane Water Pollution Control Plant treated a total of 596,292,000 gallons of raw sewage during the past year at a total operating cost of \$41,183.66. The operating cost per million gallons was \$69.07 and the cost per pound of BOD removed was three cents.

The average daily flow during the year was 1.63 million gallons with the automatic bypass to the East End trunk sanitary sewer maintaining hydraulic loadings to the Drury Lane plant within acceptable design limits.

Although the average raw sewage strengths were considerably in excess of design values, the limitation on hydraulic loading allowed the Drury Lane plant to produce an excellent effluent during most of the year. Periodic industrial shock loadings upset the biological process for short periods of time and every attempt should be made to eliminate these if the plant is to function effectively.

George Stinson is senior operator of the Drury Lane plant under the supervision of superintendent Charles Fiddy. The plant is staffed eight hours a day, five days a week with call-in service on the weekends and statutory holidays.

PROJECT COSTS

NET CAPITAL COST (Estimated)	\$676,033.78
DEDUCT - Payments from Municipalities	<u>41,721.91</u>
Long Term Debt to OWRC	<u>\$634,311.87</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1967	<u>\$181,489.61</u>
Debt Retirement	\$ 23,013.00
Reserve	3,492.46
Interest Charged	35,771.01
Net Operating	<u>41,183.66</u>
TOTAL	<u>\$103,460.13</u>

RESERVE ACCOUNT

Balance at January 1, 1967	\$ 28,731.66
Deposited by Municipality	3,492.46
Interest Earned	<u>1,697.49</u>
	\$ 33,921.61
Less Expenditures	<u>(549.72)</u>
Balance at December 31, 1967	\$ <u>33,371.89</u>

MONTHLY OPERATING COSTS

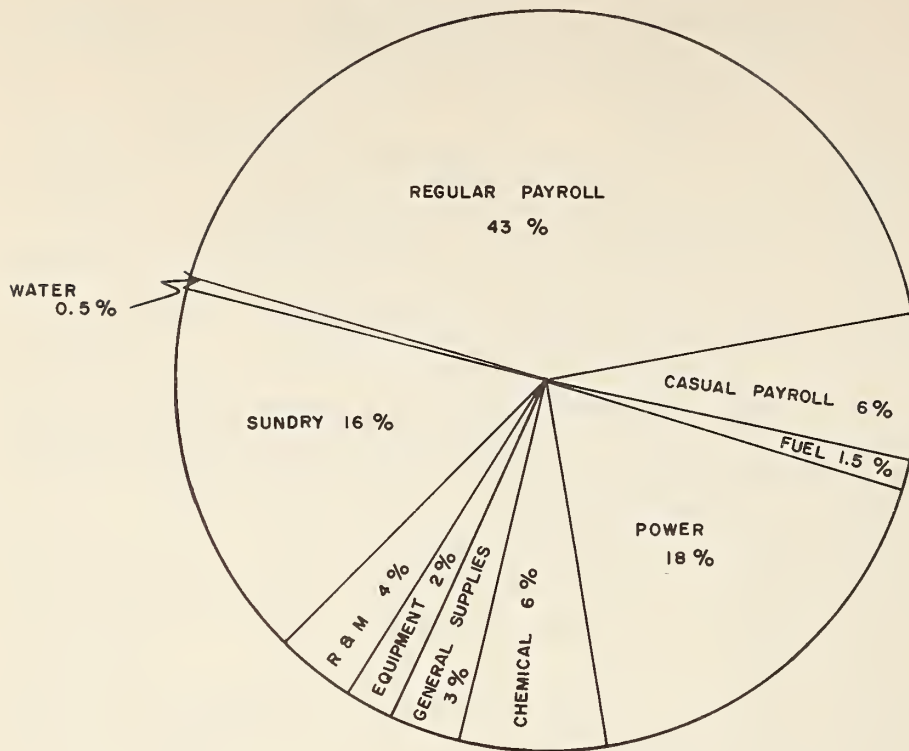
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	1,573.22	1,256.76		78.97			43.22	139.10	49.42	5.75	
FEB	2,704.89	1,268.54			561.67	228.38	39.75		38.70	558.20	9.65
MARCH	3,922.82	2,087.59		72.48	577.52	228.38	56.36		405.22	487.37	7.90
APRIL	3,355.12	1,333.49	123.17	126.09	666.95	228.38	12.65		293.18	560.34	10.87
MAY	3,715.41	1,422.27	321.98	78.52	669.62	456.76	112.06	88.75	175.44	376.69	13.32
JUNE	3,096.39	1,336.56	272.81	29.90	593.40		22.60	51.62	89.42	689.45	10.63
JULY	3,226.54	1,370.19	285.34		685.72	228.38	37.21		2.69	604.18	12.83
AUG	3,328.62	1,418.78	252.00		620.04	456.76	31.83		103.21	436.11	9.89
SEPT	3,964.79	1,982.62	484.87		698.93	275.25	25.80	148.00	(96.04)	437.16	8.20
OCT	3,355.21	1,359.40	327.88	97.34	710.77	228.38	91.33	47.04	55.16	428.76	9.15
NOV	4,089.54	1,430.17	327.88		559.11	41.16	397.54		40.06	1286.62	7.00
DEC	4,851.11	1,276.40	238.14	73.09	1034.71	228.38	409.50	385.01	291.38	895.81	18.69
TOTAL	41,183.66	17,542.77	2,634.07	556.39	7378.44	2600.21	1279.85	859.52	1447.84	6766.44	118.13

* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$4,838.40
BRACKETS INDICATE CREDIT

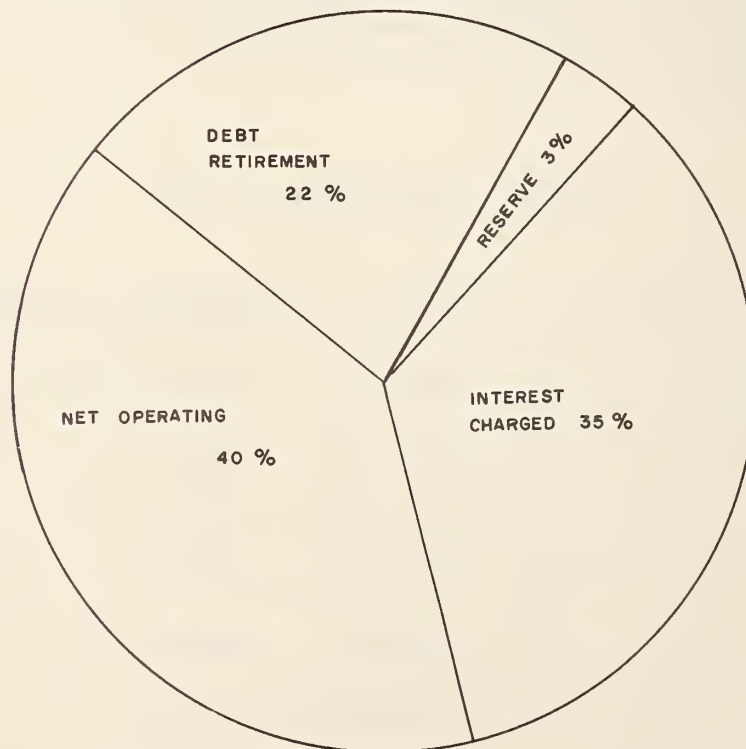
YEARLY OPERATING COSTS

YEAR	M.G. TREATED	TOTAL COST	COST PER MILLION GALLONS	COST PER LB OF BOD REMOVED
1961	734.00	\$38,823.00	\$52.20	-
1962	891.90	\$41,983.00	\$47.00	3 CENTS
1963	842.28	\$43,454.00	\$51.60	3 CENTS
1964	823.80	\$45,026.00	\$54.65	2 CENTS
1965	606.72	\$37,586.43	\$61.95	3 CENTS
1966	578.418	\$38,565.75	\$66.67	3 CENTS
1967	596.292	\$41,183.66	\$69.07	3 CENTS

1967 OPERATING COST



TOTAL ANNUAL COST



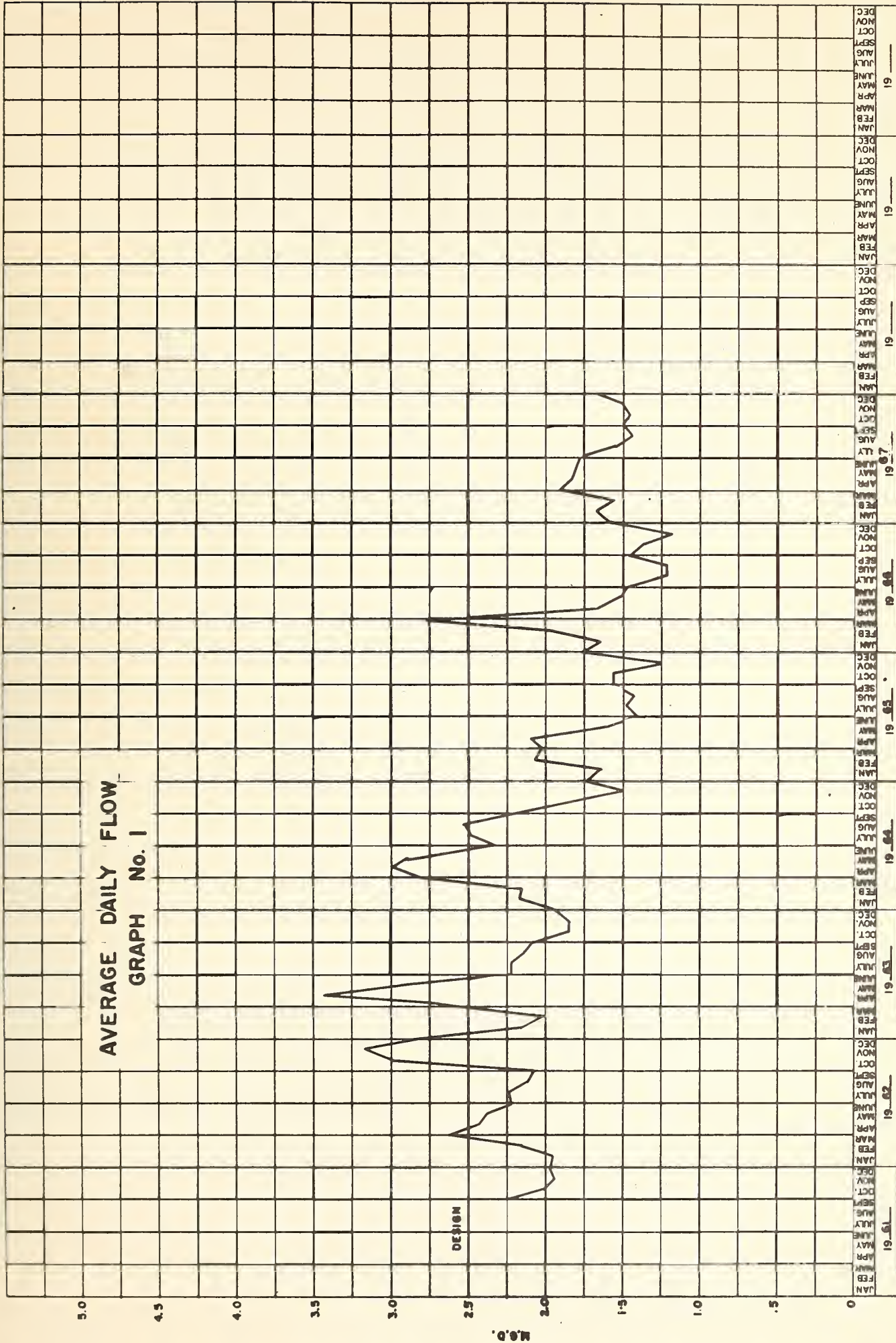
Process Data

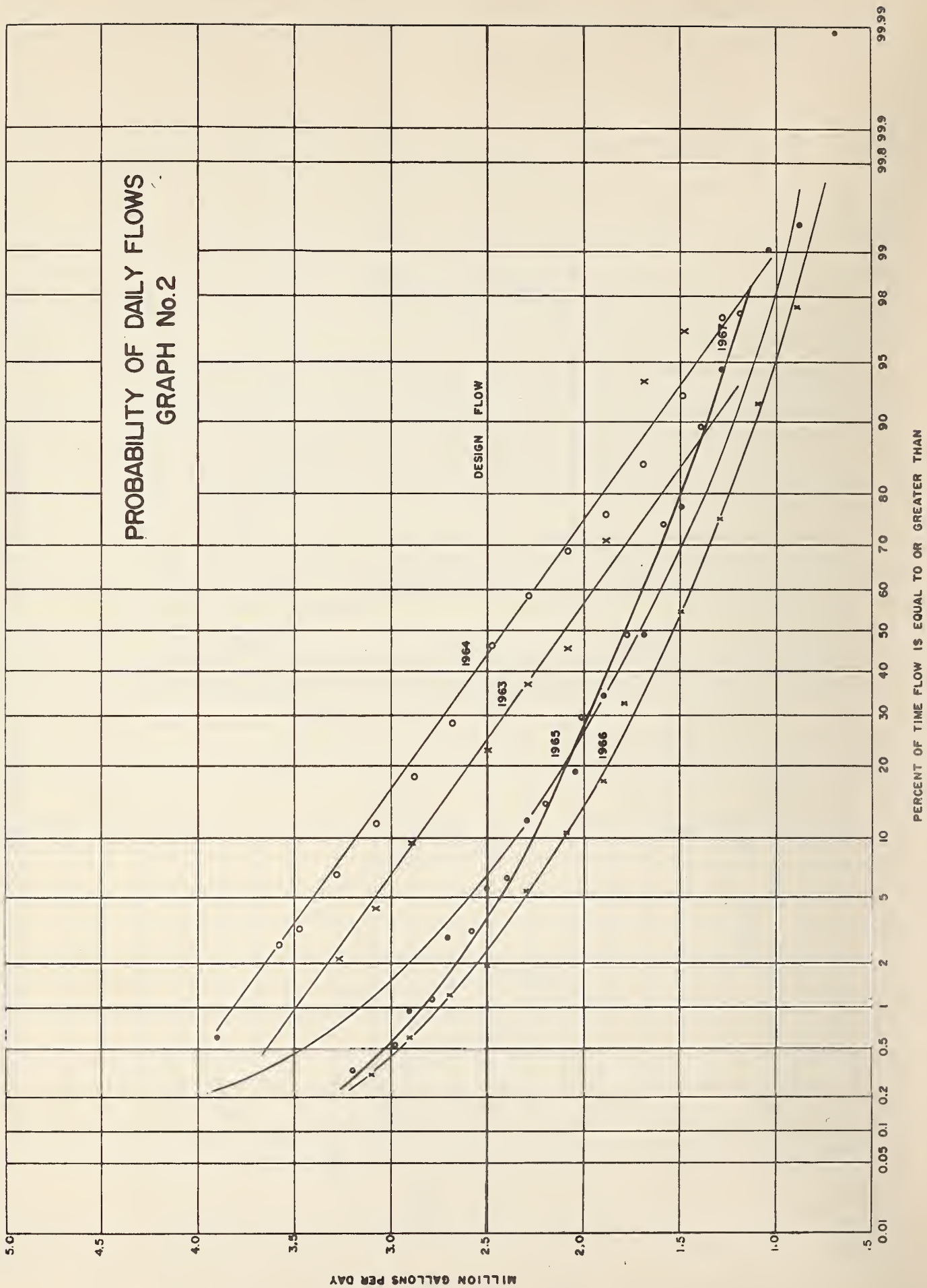
A total of 596.29 million gallons of raw sewage was treated at the Drury Lane plant in 1967. This represents a decrease of 1.7 percent from the 1966 total flow. The average daily flow for the year was 1.63 million gallons. The maximum flow for one month occurred in March with a total flow of 58.46 million gallons or an average daily flow of 1.89 million gallons. The maximum flow for one day occurred in April with a total flow of 3.10 million gallons.

The overflow arrangement at the influent works of the plant provides excellent protection against hydraulic loading. All flows in excess of the treatment capacity of the Drury Lane plant are automatically bypassed to the Skyway plant.

The two flow graphs and one flow data chart included in this report provide a complete summary of flows at the Drury Lane plant in 1967 along with a comparison of flows from previous years.

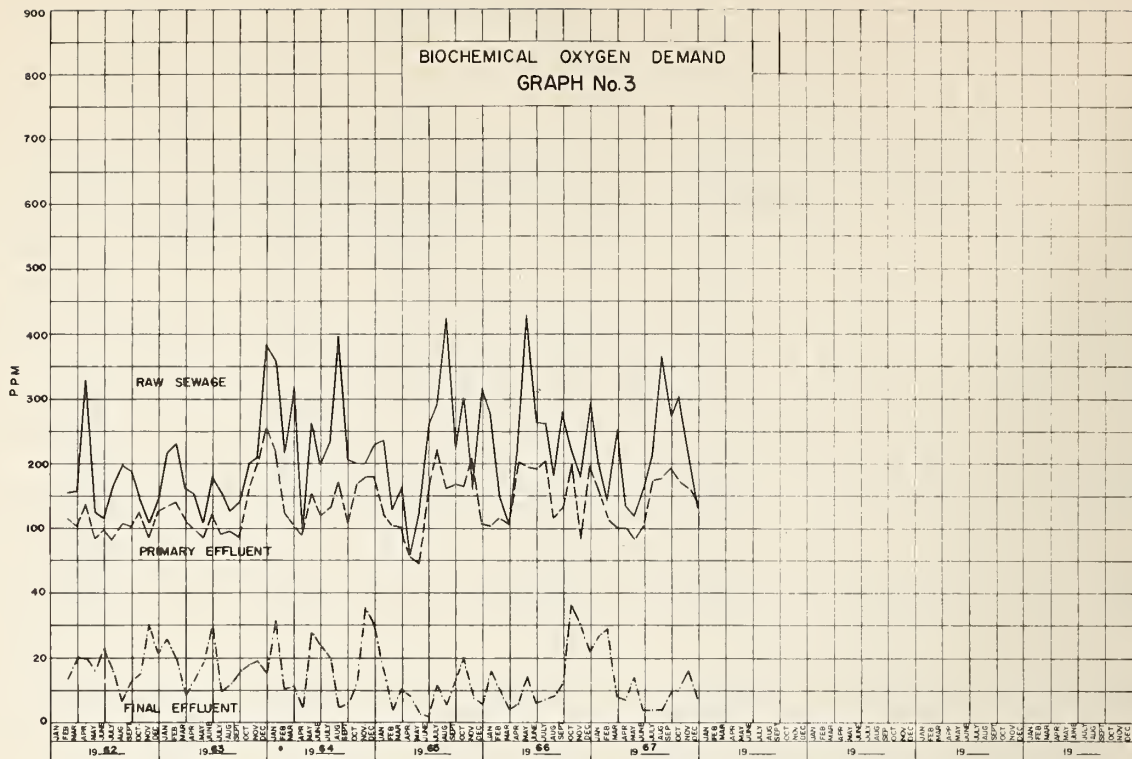
AVERAGE DAILY FLOW GRAPH No. 1



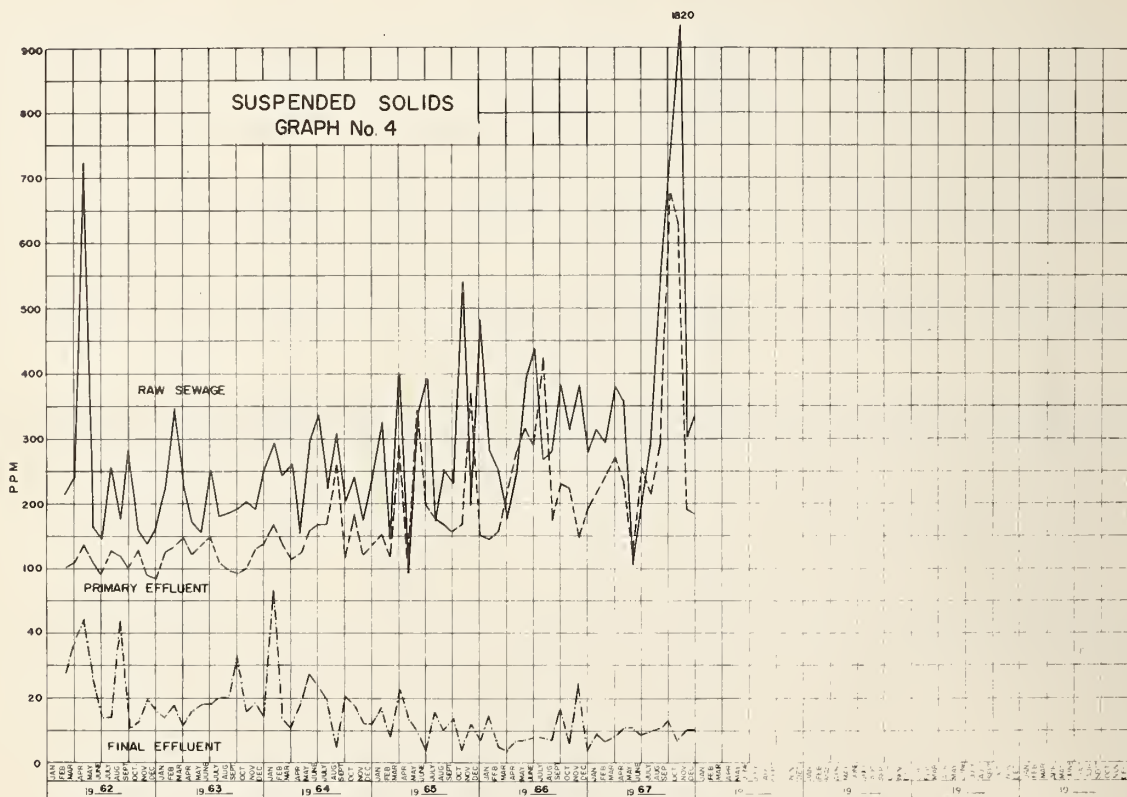


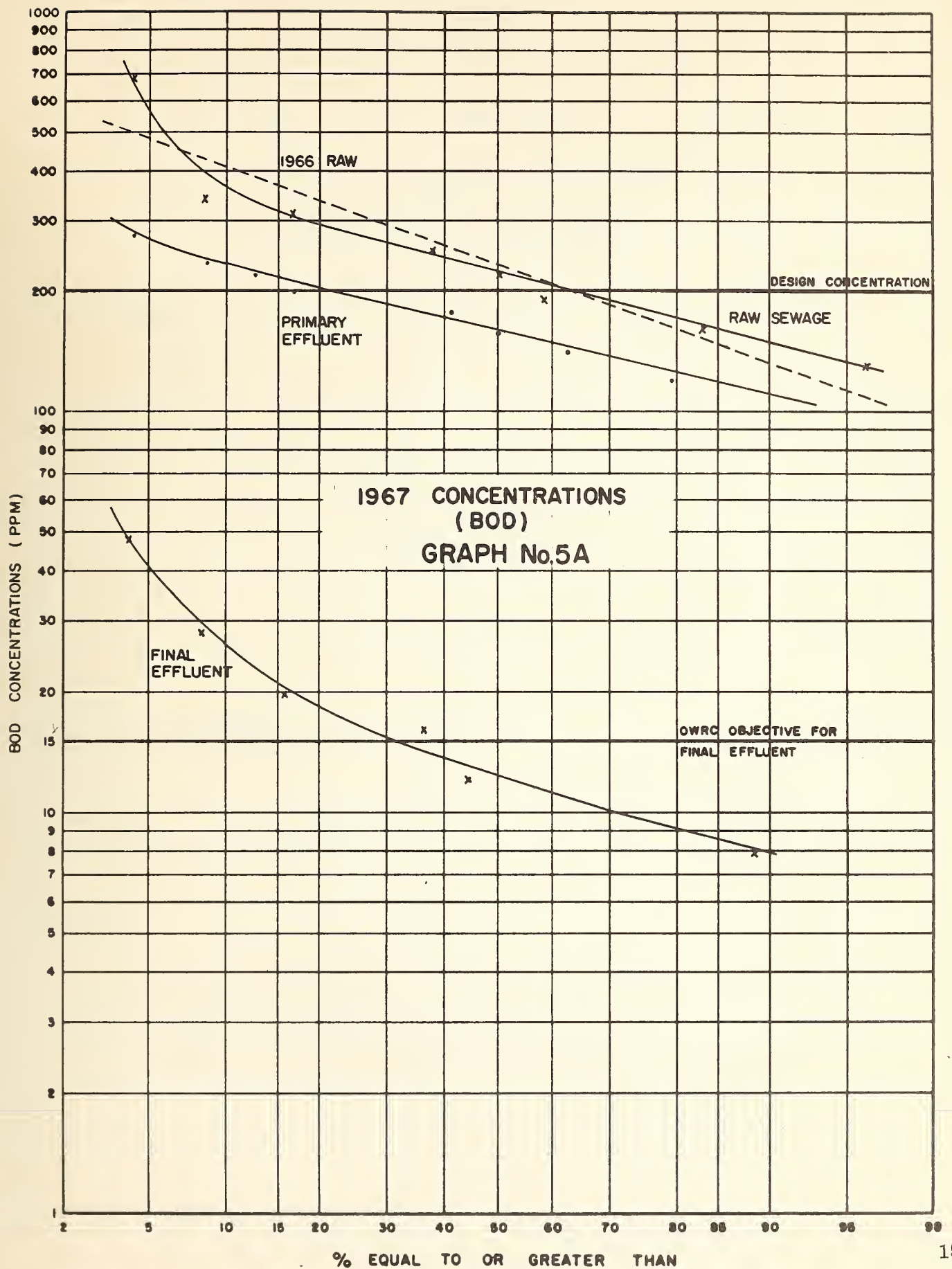
FLOW DATA

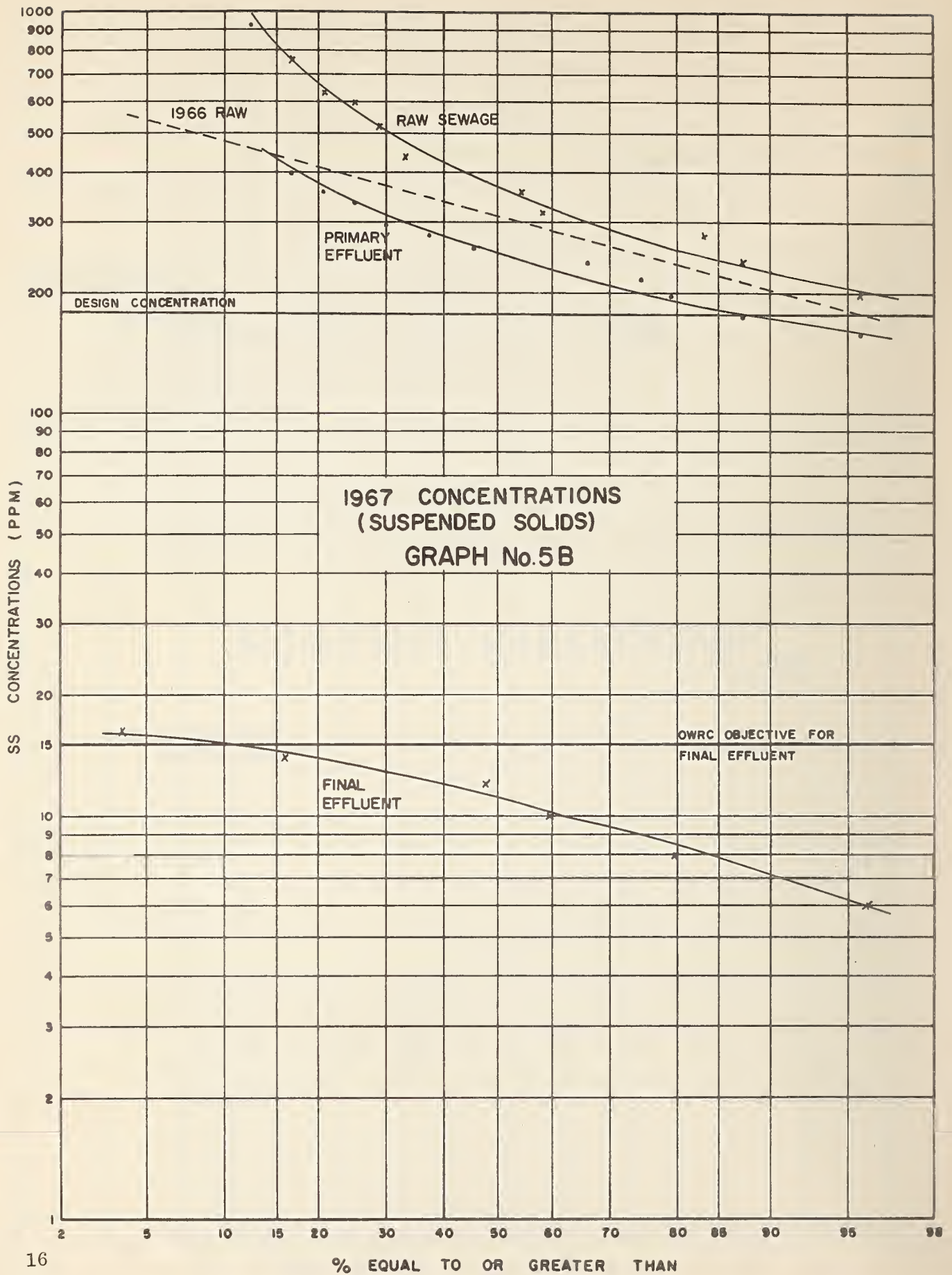
Month	Total Flow (MG)	Avg. Daily Flow (MGD)	Max. Daily Flow (MG)	Min Daily Flow (MG)	Max. Rate (MGD)	Min. Rate (MGD)
January	51.670	1.667	2.550	1.260	4.0	1.0
February	43.557	1.555	2.230	1.129	4.0	.9
March	58.460	1.886	2.930	1.290	4.0	1.0
April	55.020	1.834	3.100	1.180	4.0	1.1
May	55.743	1.798	2.300	1.180	4.0	.7
June	53.212	1.773	2.540	1.000	4.0	.9
July	47.790	1.541	2.250	.930	4.0	.9
August	44.610	1.439	1.780	.910	4.0	.8
September	44.857	1.495	2.364	.943	4.0	1.0
October	44.912	1.449	1.985	.968	3.6	.8
November	45.027	1.500	1.930	1.230	4.0	.9
December	51.434	1.659	2.770	1.175	4.0	.7
Total	596.292					
Average	49.691	1.633				



MONTHLY VARIATIONS







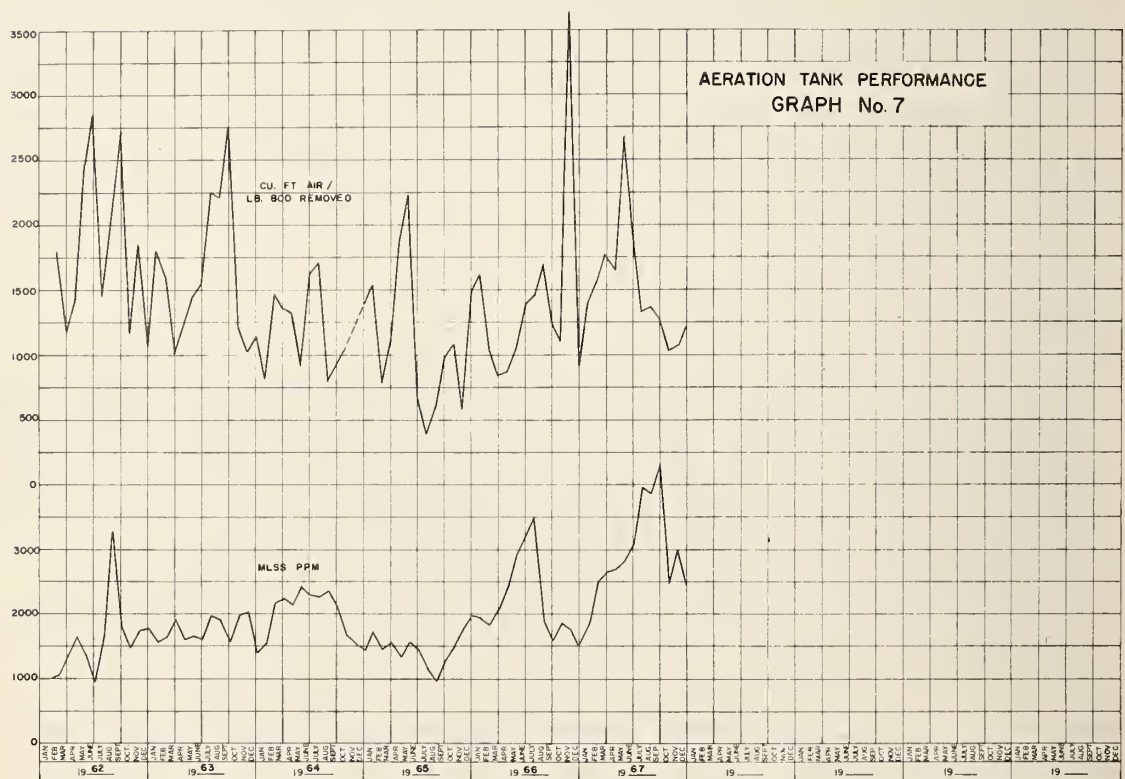
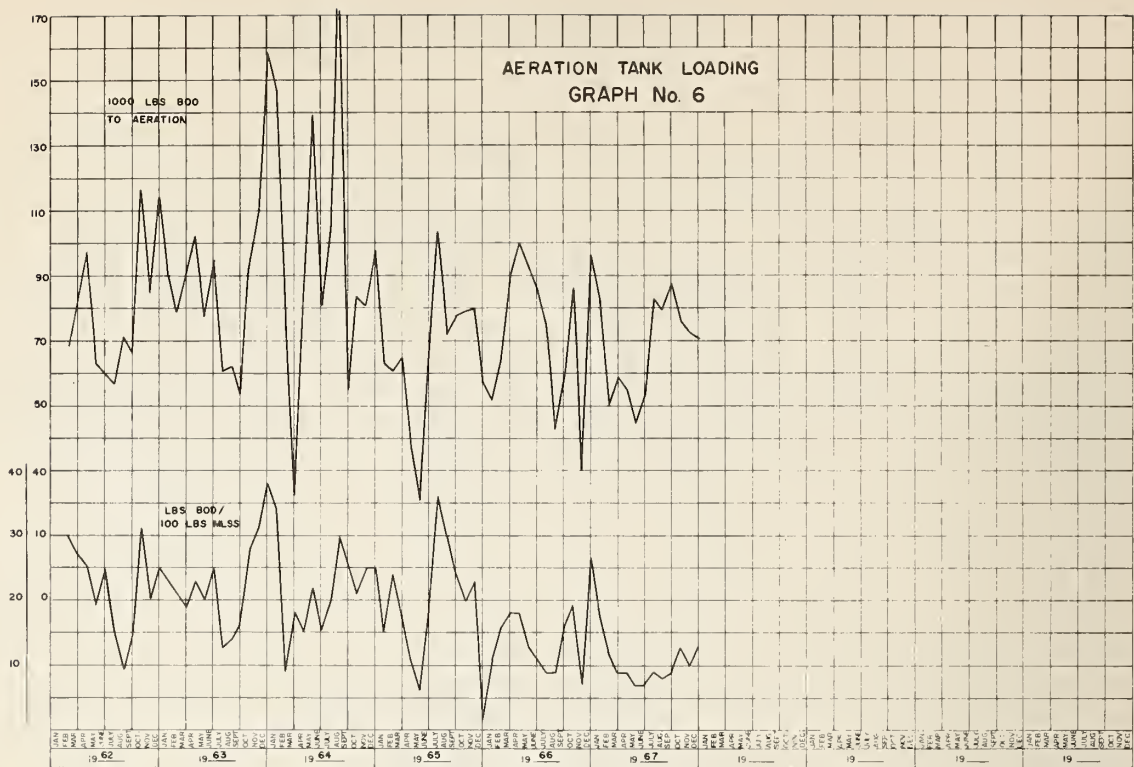
GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	202	27	86.6	45.21	318	9	97.2	79.83	20
FEB.	141	29.4	79.1	24.30	296	7	97.6	62.94	18
MAR.	255	7.8	96.9	72.26	382	8	97.9	109.32	35
APR.	136	6.7	95.1	35.57	358	11	96.9	95.46	41
MAY	119	14	88.2	29.27	106	11	89.6	26.48	52
JUNE	162	3.9	97.6	42.06	214	9	95.8	54.54	42
JULY	216	3.5	98.4	50.78	288	10	96.5	66.43	31
AUG.	367	4.5	98.8	80.85	550	11	98.0	120.22	65
SEPT.	273	9.4	96.6	59.12	720	13	98.2	158.56	51
OCT.	304	9.7	96.8	66.09	1820	7	99.5	407.13	30
NOV.	218	15	93.1	45.07	301	10	96.7	65.51	25
DEC.	136	7.2	94.7	33.12	348	10	97.1	86.92	15
TOTAL	-	-	-	613.70	-	-	-	1333.34	425
AVG.	211	11.5	93.5	51.14	457	10	96.8	111.11	35

COMMENTS

The average raw sewage BOD and suspended solids concentrations were 211 ppm and 457 ppm respectively. From the probability plots for BOD and suspended solids the design BOD of 200 ppm was exceeded 61 percent of the time and the design suspended solids concentration of 180 ppm was exceeded 100 percent of the time. The plant provided excellent treatment with an average BOD reduction of 93.5 percent and an average suspended solids reduction of 96.8 percent.

A total of 425 cu. ft. of grit was removed in 1967. This represents an increase of 75 percent over 1966.



AERATION SECTION

MONTH	PRIM. EFFL. B.O.D. PPM.	MLSS. PPM.	LBS BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	160	1833	18	1399
FEBRUARY	116	2494	12	1562
MARCH	101	2613	9	1770
APRIL	100	2693	9	1649
MAY	81	2803	7	2687
JUNE	102	3070	7	1892
JULY	174	3952	9	1339
AUGUST	179	3869	8	1374
SEPTEMBER	197	4263	9	1284
OCTOBER	173	2437	13	1030
NOVEMBER	163	2976	10	1070
DECEMBER	139	2363	13	1202
TOTAL	-	-	-	-
AVERAGE	140	2947	10	1522

COMMENTS

The primary clarifier removal efficiency for BOD was 54 percent for the year. The MLSS fluctuated between a high of 4,263 ppm and a low of 1,833 ppm on a monthly average basis. The aeration tank loading averaged 10 pounds of BOD per 100 pounds of MLSS as compared to 14 in 1966. This reduction is due primarily to an increase in the MLSS. The cubic feet of air supplied per pound of BOD removed was increased slightly from 1419 to 1522.

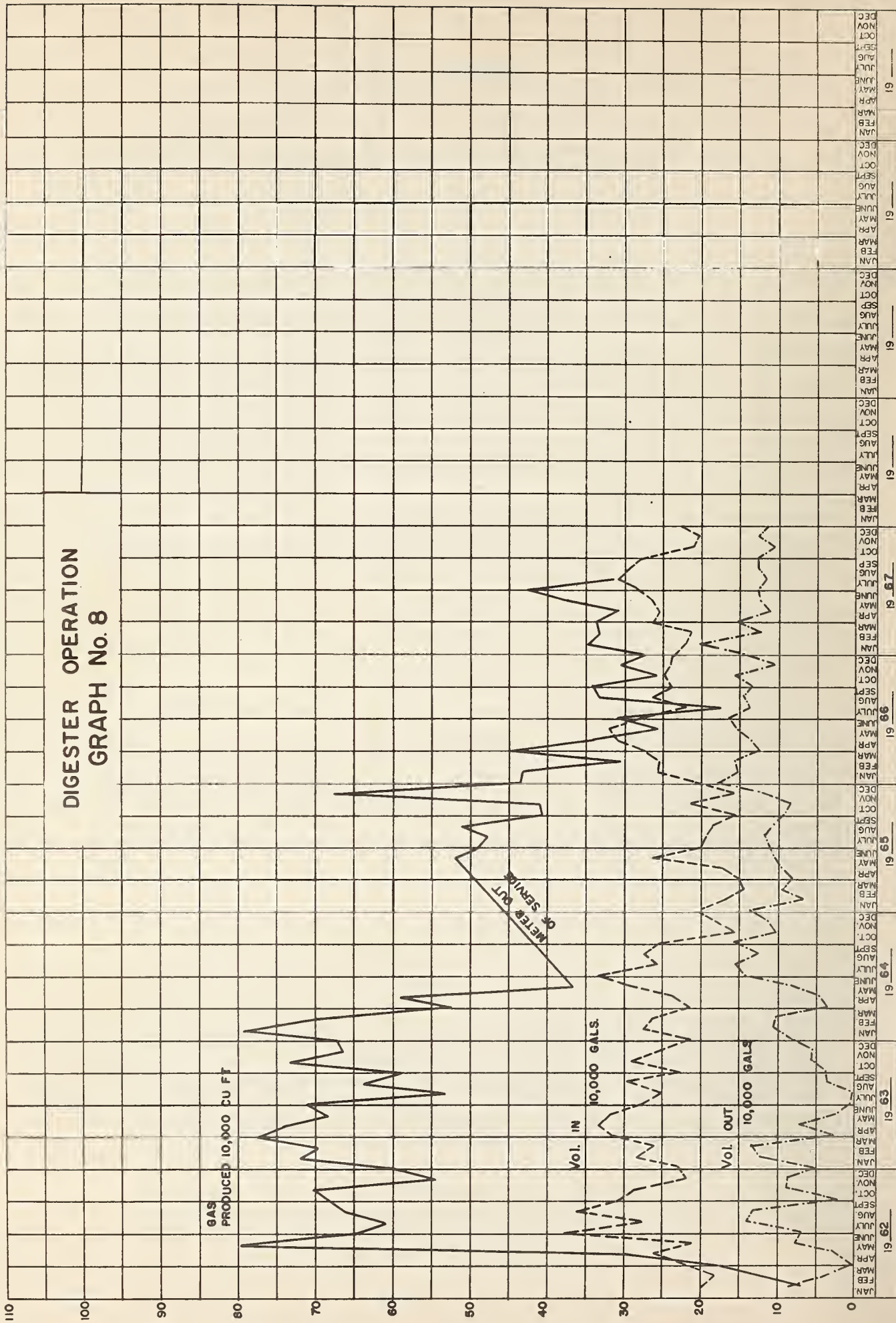
DIGESTER OPERATION GRAPH No. 8

GAS
PRODUCED 10,000 CU FT

METER OUT
OF SERVICE

Vol. IN
10,000 GALS.

Vol. OUT
10,000 GALS.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	GALLONS	% SOLIDS	% VOL. MAT.	GALLONS	% SOLIDS	% VOL. MAT.	
JAN.	220680	3.6	67.0	201501	4.1	53.5	349.000
FEB.	212369	3.6	62.1	122064	4.2	48.6	334.714
MAR.	262109	4.1	58.1	151380	4.2	51	338.000
APR.	257661	3.7	55.5	110439	5.8	47	306.800
MAY	262693	3.9	56.3	124001	5.2	43.2	375.600
JUNE	282850	4.7	56.0	125939	4.5	45.7	429.200
JULY	308648	4.6	54.0	118190	4.6	47	316.500
AUG.	295870	3.7	54.1	125939	4.4	48.4	-
SEPT.	275732	3.6	60.2	125940	4.3	42.1	-
OCT.	210970	3.8	54.6	104627	5.1	44.0	-
NOV.	202794	4.2	51.7	122064	5.1	51.1	-
DEC.	225463	3.8	53.0	112376	4.4	48.0	-
TOTAL	3017839	-	-	1544460	-	-	*4199.676
AVG.	251487	3.9	56.0	128705	4.7	47.5	349.973

* Prorated on 7 months data

COMMENTS

A total of 3,017,839 gallons of raw sludge was pumped to the primary digesters in 1967. This is approximately the same amount as was pumped in 1966. The average percent of solids in the raw sludge was 3.9 percent and the average percent solids in the secondary digester sludge was 4.7. A total of 1,544,460 gallons of secondary digested sludge was removed by the sludge haulage contractor. The percent reduction in volatile matter in the digester averaged 29 for the year.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	51.670	1487	2.88
FEBRUARY	43.557	1272	2.92
MARCH	58.460	1578	2.70
APRIL	55.020	(1) 1495	2.72
MAY	55.743	(2) 1550	2.78
JUNE	53.212	1825	3.42
JULY	47.790	1749	3.65
AUGUST	44.610	1630	3.65
SEPTEMBER	44.857	1438	3.20
OCTOBER	44.912	1287	2.87
NOVEMBER	45.027	(3) 340	2.83
DECEMBER	51.434	-	-
TOTAL	596.292	15651	-
AVERAGE	49.691	1423	3.06

(1) 29 days chlorination

(2) 30 days chlorination

(3) 8 days chlorination

COMMENTS

Chlorination is required for disinfection of the final effluent. An average chlorine dosage of 3.06 ppm was necessary to maintain a residual of not less than 0.5 ppm following 15 minutes' contact.

CONCLUSIONS

The Drury Lane Water Pollution Control Plant produced a satisfactory effluent for most of the time during 1967. The biological process was periodically upset by severe industrial wastes loadings. The Drury Lane plant treats the largest percentage of industrial wastes within the municipality and is periodically subject to shock loadings which would indicate the dumping of batch wastes by local industries.

The routine industrial waste loading is tolerable if the shock loading can be eliminated.

Date Due	
ONTARIO WATER RESOURCES COMMISSION DIVISION OF PLANT OPERATIONS.	
BURLINGTON (DRURY LANE)	
OPERATING SUMMARY 1967	
TD 227 / B87 / D78 / W38 / 1967 / MOE / RSKb	
DATE	CJ ISSUED TO COPY #1.

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Burlington Drury Lane : water
pollution control plant.
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